THE UNIVERSITY OF WASHINGTON

Arboretum bulletin

FALL 1964

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THE UNIVERSITY OF WASHINGTON

Arboretum bulletin

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TABLE OF CONTENTS

The New Seattle Public Library—In a Landscaped Setting . . Cash M. Beardsley 54
Plant Exploring Around Lake Washington . . . . . Lyn Davis 56
Seattle Needs More Street Trees . . . . . Henry Schmitz 58
An Arboretum of True Firs in Grass Valley, California . Woodbridge Metcalf 60
Gardens and Fertilizers in Western Washington . . . . Stanley P. Gessel 61
Harmful Plants . . . . . Lovisa G. Wagoner 63
From Our Correspondents 71
New Members 71
Some of Our Favorites 72
Book Reviews 74

COVER PHOTO:
Tree of *Stuartia Pseudo-Camellia* in Camellia garden
PHOTO BY: B. O. MULLIGAN

The New Seattle Public Library—in a Landscaped Setting

CASH M. BEARDSLEY*

THE new Seattle Public Library was one of the first downtown buildings in Seattle to be set back from the sidewalk line with landscaped plazas leading into the building. The architects, Bindon & Wright, associating with the firm of Decker & Christenson, gave the landscape architects a free hand in shaping the areas outside the building so that the walls and paved areas served their necessary function in a manner that permitted a generous use of plant material to soften and enhance the architecture.

Fortunately for the immediate impact of the landscape effect as regards some feeling of maturity, there was considerable specimen plant material existing on the site of the new building. The area over the book stacks, below the Fifth Avenue level, had previously been developed as a landscaped plaza surrounding a Public Information Center. Consequently, this plant material was removed prior to initiation of new construction and heeled-in at Volunteer Park until the new building was completed.

With this material available as a basic element in the planting design, the Library Board agreed to have the landscape architects select the remainder of the plant material without resorting to a call for bids which would have diluted the quality of the material by having to accept the lowest bid. The remainder of the landscape installation was handled on a selective bid basis per the landscape architects' plans and specifications.

The landscape design evolved around the architectural format and the selected types of building materials. The raised planter beds in the landscape design repeated the masonry finish of the building and the finish of the planter tubs reflected the mosaic texture on the building so that the architectural materials provided a subtle transition between the landscaped plazas and the main building. The extensive use of masonry materials was in turn softened and complemented by the use of mountain rock and large pieces of driftwood as solidifying accents to give a true Northwest flavor. The fountain sculpture on the Fifth Avenue terrace, by George Tsutakawa, further added a playful note and provided an interesting center of interest for this small sit-in park.

In order that the landscape treatment might be enjoyed at night as well as during the daylight hours, a generous use was made of garden lighting fixtures which made the outdoor areas look lived-in. Stone benches as well as the seat height walls serve to invite the passer-by to pause and enjoy the setting. In line with the Library's educational purposes, all of the specimen plant materials were labeled as to common and scientific name.

Landscape construction in a congested downtown area presents some interesting problems in logistics wherein the landscape materials must be stockpiled off-site in readiness for delivery to the construction site at the proper time. In addition to the heeling-in of the plant material on hand, there was the collection of the balance of the plant material, the mountain rock, the driftwood, and the stones for pebble-paving in the textured paved areas. For instance, the mountain rock had to be selected and moved out of the snow country the previous fall in order that it be available for placement in the spring. The driftwood pieces were collected on Camano Island and the flat stones for the pebble-paving from the Columbia River bed at Van-

Above— →

Seattle Public Library, entrance plaza, upper level. Northern red oaks with *Viburnum Davidii.*

FIG. 4 PHOTO BY: DISTINCTIVE PHOTOGRAPHY Seattle, August, 1964

Below—

Seattle Public Library, 4th Ave. entrance. Three Ginkgo trees, with junipers beneath them.

FIG. 5 PHOTO BY: DISTINCTIVE PHOTOGRAPHY Seattle, August, 1964

*Member, American Society of Landscape Architects. Landscape Architect, Seattle Park Department, since 1949.

tage Ferry, in central Washington, to get stones of the desired brown color.

There was also the underground planting bed preparation which is not apparent in the final result but which was most important to the successful survival of the plant material. Inasmuch as most of the planting areas were built up over underground concrete slabs, all of these areas had to be drained with depressed inlets collecting the run-off into tile lines connected into the sewer. This drainage system was covered with a minimum of six inches of pea gravel, or where load bearing was a structural problem lava chips were used to lighten the load. A cushion of 130 cubic yards of sandy loam topsoil covered the gravel before adding 525 cubic yards of three-way mix.* An automatic sprinkler system was then installed before initiation of planting operations.

Knowing that the first question is usually "How much will it cost?," a rough breakdown of the landscape construction costs on the Library job may be of interest:

*Consists of one-third each of topsoil, peat and barnyard manure, mixed, composted, and turned three times at monthly intervals.

(Continued on Page 75)

Plant Exploring Around Lake Washington

LYN DAVIS*

ON THE *theory that one doesn't have to travel far afield in search of ideas and inspiration in gardening, we decided to do a little plant exploring right here in the Seattle area. It was our pleasure to visit a few gardens this spring belonging to active Arboretum members who are all good "dirt gardeners." Notes that were taken on successful plant grouping and interesting flowering combinations are included below. Further contributions of garden successes from all members would be most welcome.*

From the living room windows at the H. Martin Smith Jr. home on Mercer Island, one looks across a strip of lawn to a series of mounded beds. Here, in earliest spring, the light yellow trusses of dainty *Rhododendron* 'Bo-Peep' open above a carpet of violet and dark yellow winter flowering pansies (hardy the last two winters, at least). In May the azaleodendron, *Broughtonii aureum,* and the species *oreotrephes* flower together in yellow and lavender, accented by a drift of parrot tulips in a more intense shade of lavender than *R. oreotrephes.*

In autumn the compound leaves of a staghorn sumac provide a blaze of color with the foliage of the Oregon azalea, *R. occidentalis,* also coloring brightly beneath it and blending with the rusty shade of the winter leaf of the azaleodendron.

In the John R. Cooper garden, near the Smith's on Mercer Island, an interesting plant grouping grows in full sun next to the driveway. A large specimen of the deciduous *Cotinus coggygria* 'Purpurea' with billowing branches of dark reddish-purple orbicular leaves, silvery beneath, is planted behind a border of gray-needled juniper. Clumps of bearded iris planted near the smoke tree open their flowers on slender stalks in late spring. In summer, *Ceanothus* 'Gloire de Versailles' flowers close by and continues the color scheme.

Next we visited the garden of Mr. and Mrs. Conner Gray, Jr., down on the north shore of Mercer Island. Here, in full sunshine against the bright blue of the lake, *Photinia serrulata,* the large evergreen shrub with red stems and bronze new growth, forms the background for a fine form of *R. lutescens.* 'Dorothy' primroses are massed beneath the shrubs. The latter two open soft yellow blooms in late March and early April. Accompanying them are perennial wallflowers in shades, of rust, red, and golden yellow.

At the opposite end of the lake in Sheridan Heights, a low-maintenance front entrance planting in the William A. Robinson garden is well worth noting. An upright, horizontal-

*Mrs. (Donald C.) Davis is a most faithful member of our Editorial Board.

branching specimen of *Enkianthus campanulatus* is the focal point in this west-facing planting. Large embedded rocks are softened by Mugo pines, a carpet of 'Springwood White' heather, and a grouping of the hardy evergreen rhododendron hybrid 'Goldsworth Yellow.' In May, the apricot-colored bells of the enkianthus flower simultaneously with the rhododendrons. The bright green new growth of the heather and the dark needles of the pines set off the flowers.

In Medina Heights, on the east side of the lake, a colorful border in the Stephen E. Anderson garden is visible from the street—a real traffic-stopper in the spring. It is composed of white and yellow lily-flowering tulips, vigorous primroses in yellow, white, and bronze, and specimens of *Rhododendron* 'Unique' with its apricot to cream trusses opening against a background of blue spruce.

Farther on in the garden a sunny, open bed near a pool contains among other trees and shrubs, a highly cherished specimen of *R. Keiskei* x *R. spinuliferum* (apricot form) trained low and wide, near the small maple, *Acer japonicum* 'Aureum.' Tiny-leaved rhododendron species are planted in the foreground with miniature bulbs such as *Narcissus rupicola, N. Watieri, Tulip biflora, T. tarda (dasystemon)* and *T. Batalinii.*

In the H. H. Kamphenborg garden in Beaux Arts, a shrub grouping by the drive in the partial shade of a Whitcomb cherry was planned for a sequence of bloom for four months in shades of pink and white. Flowering with the cherry are *Rhododendron cilpinense* and *Pieris japonica,* followed by R. 'Bow Bells' and azalea 'Pinky Pearce.' Next to bloom are plants of *Kalmia latifolia* with a good pink form of *R. carolinianum* bringing color to the border well into July.

Another planting that provides color over a two-month period is made up of the dwarf rhododendrons 'Blue Bird' and 'Sapphire' ('Blue Bird' is the first to bloom), with *R.* 'Devonshire Cream' flowering last in the background. A young tree of the rare single-flowered white cherry, 'Tai Haku,' has been planted with them to give filtered shade and additional bloom.

Situated on the high bluff of Evergreen point overlooking Lake Washington is the Jay DeFriel garden. A long-lasting winter color scene in the upper garden of "Lakecliff" is one of Mrs. DeFriel's favorite plantings. Against a background of native western red cedar, drifts of early purple 'King George' heather flowers for several months, accented by purple and yellow crocus groupings. *R. mucronulatum* and *R. praecox,* in varying shades of rose-purple, bloom with the heather beneath the yellow blossoms of the deciduous tree, *Cornus Mas,* which puts on a good show for six weeks in this garden.

The house is at the foot of the bluff, reached by elevator, and here on the lake is another garden resplendent with shaded plantings of primroses, fibrous begonia, prime tuberous begonias, feathery astilbes, ferns and fuschias, all backed with lustrous-leaved evergreens such as the all-green Aucuba and Skimmia. Light green, moss-like groundcover, "Baby's Tears," edges the beds and sets off the bright colors.

Below—

Members of East Mercer Way Arboretum Unit No. 6 in the J. T. DeFriel garden.

FIG. 6 PHOTO BY: LYN DAVIS

Seattle Needs More Street Trees

HENRY SCHMITZ*

FIRST let me say how happy I am to be invited to speak at this meeting of the Western Chapter, International Shade Tree Conference. This is a unique experience for me. Never before have I had the privilege of participating in the deliberations of the National Shade Tree Conference or in those of any of its Chapters. In a sense this is both a disadvantage and an advantage. A disadvantage because I have no point of reference as to what might be appropriate to discuss and an advantage because I have no knowledge of any official positions of the Conference or its Chapters. I am in the happy position of being free and unrestrained by the Conference's traditions. I do know, of course, that the organization is known as the International Shade Tree Conference and a reasonable presumption would be that it is interested in shade trees.

As a native of Seattle, who spent about half of his life outside Seattle, as a forester and botanist, and as the son of a father who retired early in life to engage in his hobby of gardening in a big way and who served as a member of the Seattle Board of Park Commissioners for many years early in this century, I can hardly be unmindful of the fact that trees have been planted along our streets for many years. It is my considered opinion that we now have fewer trees but more power poles and concrete than we had fifty or sixty years ago, and that a smaller percentage of our people are interested in beautifying our city through the use of street trees than were so interested fifty or sixty years ago.

There are perhaps many reasons for these changes which I shall not attempt to discuss. Suffice it to say that if my analysis of the situation in Seattle is reasonably accurate, and if it is typical of many other American cities, the International Shade Tree Conference has its work cut out for itself.

Now I would not wish to leave the impression that I think that we had no shade tree problems in Seattle sixty years ago. I well remember the street in a relatively new development on which I lived as a boy. My father planted horse chestnut trees as street trees, his neighbor something else. Within one or two blocks we could find everything from mountain ash, soft maple, hawthorne, catalpa, and elm to name only a few. This was a period of rugged individualism, and I presume the choice was made on the basis of the individual property owner's tastes and the persuasiveness of the itinerant tree salesman. Fortunately, this was a little before the *Araucaria* salesman came around with his hideous wares. Adequate consideration was not given to the ultimate appearance of such a street or the suitability of the trees for the purposes they were to achieve. Certainly the impact of the automobile was not considered. One thing, however, seems clear—the property owners of that period had enough pride in their property and in the city to try to help beautify them however poor their judgment may have been.

Happily or unhappily only a few of these trees are left today. Power poles and concrete have replaced them. The street I have in mind is far from a beautiful street today—it lacks both grace and charm. It has largely succumbed to this thing called progress—filling stations, billboards, apartments, and chain groceries. I like to think, however, perhaps for sentimental reasons that the few trees that do remain, however poor their choice may have been, give a touch of hope and grandeur to a relatively drab scene.

This leads me to an inescapable personal

*This stimulating and thoughtful address was most fittingly presented by Dr. Schmitz, President Emeritus, University of Washington, at the first meeting in Seattle of the Western Chapter, International Shade Tree Conference, June 22, 1964.

conclusion. In our ugly modern cities—any tree, no matter how poorly adapted to its situation, is better than no tree at all. I hasten to add, however, that there is no reason today why "any" tree should be planted as a street tree. We now have enough experience and "know how" to select only those species of tree which will contribute most to the ultimate beauty of the city at the lowest cost.

If any of you think the situation I have described was peculiar to that period, I suggest that you look about you in downtown Seattle and in the outlying shopping districts. You will find all kinds of trees planted in all kinds of containers. Trees ranging from oaks to alpine fir are planted in round or rectangular containers of wood or concrete. There is little excuse, I feel, for such a mixture of tree species or containers on city streets in a single block, but again I would add that any tree or any kind of a container is better than no tree at all. In my opinion University Properties in this immediate area have done a most competent job of planting pyramidal oaks in attractive rectangular containers—and one could have wished that more property owners would have followed their lead.

Few developments have contributed more to the deterioration of beauty in our modern American city than the automobile. As the number of automobiles increased, it was necessary, or thought to have been necessary, to widen many of our streets. This was often done by the elimination of the parking or grass strip and such shade trees planted thereon in former years. In other areas where foot traffic was heavy, the sidewalk was widened at the expense of the grass strip and often with all the trees thereon. I have often been amazed at the vitality of the power pole. No matter what else happened to the grass strip or the trees, the power pole remained. The automobile and the power pole to be sure often come into direct contact, but the power pole always wins.

No one in his right mind would suggest the elimination of the automobile in order to save grass strips and shade trees. I am far from convinced, however, that they are mutually exclusive—that one must be eliminated to have the other. If the present trend of destroying the natural charm and beauty of Seattle is to be stopped or at least decelerated, it will be necessary to do much more first-class thinking about the problem than it has ever received before. When one considers the quality of thought which has been given by citizens and the press to the problems of mass transportation, sewage disposal, the civic center and many other civic problems and compares this with that given the preservation of the natural beauty of our residential, and indeed our business district, one can only conclude that the comparison leaves much to be desired. Is it too much to hope that the International Shade Tree Conference, perhaps cooperating with such local groups as the Citizens Planning Council, Allied Arts, and other appropriate citizens' groups might play a decisive role in focusing more adequate attention on this important problem?

It is true, of course, that in Seattle we have our Art Commission, our City Planning Commission and a plethora of other boards, committees and councils. Indeed it often appears that we have a formal citizens' group or official group to consider every problem. I submit, however, that our street and shade trees in Seattle are not the object of the major concern of any public agency or indeed of the individual property owner. It is my opinion that the status of shade trees in the city is deteriorating progressively.

Personally I have long had the feeling that we in Seattle, as in many other cities, need to restudy the entire problem of street and shade trees in the light of modern circumstances. Such a study, I believe, can best be made by a high class, competent, unpaid citizens' committee appointed by the mayor. This committee would not be an action committee—its function would be only to study the entire problem and to make recommendations to the mayor. To be effective, the committee must have status, it will require the

(Continued on Page 72)

An Arboretum of True Firs in Grass Valley, California

WOODBRIDGE METCALF*

SEVERAL years ago I suggested at a field meeting of the California Christmas Tree Growers, the desirability of having a growing area where all of the true firs *(Abies)* of the world might be planted in group arrangement and their subsequent growth and development observed. County Farm Advisor Douglas Hamilton of Nevada County approved of the idea, discussed it with his associates in Grass Valley and to the 4-H Club leaders in the county. They voted to adopt the idea as a 4-H Club service project for the county and they presented to the Grass Valley City Council a request that an area of the tract of 65 acres recently left to the City in the will of a Mrs. Condon be allocated for such use. The Council approved of the plan and an advisory committee was set up to assist Douglas Hamilton and the 4-H Club Council in carrying out the details of the program. That was in the summer of 1960.

A gently sloping area of about 4 acres was selected which had a cover of scattered pole-size trees of Ponderosa Pine with a heavy understory of manzanita and other brush species. The elevation is approximately 2,000 feet and the slope to the northeast. The county office of the California Division of Forestry agreed to remove and dispose of the brush from the initial planting area of about 3 acres, and this was done during the fall and winter. The few widely spaced Ponderosa Pines were left to supply some shade for the planted trees.

Plans were made for planting as many species of *Abies* as could be secured in lots of 20 to 25 and California Arbor Day, March 7, 1962 was selected as the time for starting the planting and for dedication of the Arboretum. Several coniferous nurseries were advised of the program and generously agreed to supply planting stock of the species they had available for planting. These included Critchfield Nursery, St. Helena, Donly Gray Nursery, Elverta, The Hofert Nursery, Olympia, Washington, Institute of Forest Genetics, Placerville and G. Dobbins of Stockton. Martin Syverson sent *Abies lasiocarpa* from the U.S. Forest Service in Oregon.

Prior to the dedication ceremonies on March 7th, 1961, a number of 4-H Club members had dug planting holes and carried stakes to each of the group planting sites, while the Future Farmers of Grass Valley High School had prepared very attractive scribed markers for each species group and a larger marker designating the area as the WOODBRIDGE METCALF FIR ARBORETUM. The ceremonies took place in the Veterans' Memorial Building with the Mayor, members of the City Council and County Board of Supervisors, 4-H Club Council, Future Farmers, Nevada County Soil Conservation District, California Division of Forestry, U. S. Forest Service and others in attendance. The following trees were planted on that, and two succeeding days, and the markers were put in place:

Abies Fraseri	Fraser Fir	11 trees	Critchfield
" *Nordmanniana*	Nordmann Fir	26 "	"
" *concolor*	White Fir	30 "	" & Hofert
" *Pinsapo*	Spanish Fir	25 "	Dobbins
" *Bornmuelleriana*	Turkish Fir	18 "	Critchfield
" *balsamea*	Balsam Fir	25 "	Gray
" *Forrestii*	Chinese Fir	13 "	Inst. Forest Genetics
" *lasiocarpa*	Alpine Fir	25 "	U.S.F.S. — Oregon
" *magnifica*	Red Fir	25 "	Critchfield
" " *shastensis*	Shasta Fir	25 "	Hofert
" *amabilis*	Silver Fir	25 "	"
" *procera* (nobilis)	Noble Fir	25 "	"
" *cephalonica*	Greek Fir	1 "	Metcalf (natural seedling)
" *grandis*	Grand Fir	29 "	Hofert & Critchfield

*Prof. Metcalf is Extension Forester, Emeritus, at the University of California, and an authority on the cultivated species of *Eucalyptus*.

(Continued on Page 76)

Gardens and Fertilizers in Western Washington—Part 1

STANLEY P. GESSEL*

THE average gardener probably likes nothing better than a good green lawn and healthy, vigorous trees, shrubs, and flowering plants. As a casual observer, I feel that this goal is seldom realized by many gardeners and mainly because they do not understand a few facts about plant food requirements. Few gardeners seem to realize that plants have to extract elements essential to the life of the plant from the soil in addition to water. Ordinary tap water does not supply these elements, and as a plant is not free to roam at will for food it suffers malnutrition, but not without visual symptoms. If these symptoms are recognized, correction is generally certain if proper treatment is applied.

Proper treatment may not be a simple matter, particularly if one is confused by the great array of fertilizer materials available at the garden store and, therefore, the necessity to make a specific selection. For his own protection, the gardener should know a few facts about soils, fertilizers, and plant nutrition.

These brief remarks will be designed to answer some questions for the gardener but will not be a treatise on soils and fertilizers. Like most of the questions confronting us in life, there is no one easy solution to problems relating to the complicated relations between soils and plants. All plants are not the same, and all soils are not, so we are faced with an array of variables and have to punch the proper buttons to come up with an answer. The major problem is which button to punch. I think a brief background in soils and plants will provide a basis for at least discussing this.

We are actually dealing with three basic variables:

1. The elemental requirements of plants.
2. The supply of these elements in any given soil in available form.
3. How best to make up any deficiencies existing between the first two.

*Professor of Forest Soils, University of Washington.

Elements essential for plant growth are the subject of continuing investigations by researchers throughout the world, and it is likely that the list will be expanded. However, those now recognized essential to plant growth can be listed in two groups: (1) those needed in relatively large quantities, and (2) those needed in very small amounts. The first group are called macro-elements and the second micro-elements. Macro-elements include nitrogen, phosphorus, potassium, calcium, magnesium, and sulphur. Micro-elements include iron, copper, boron, manganese, molybdenum and zinc.

These elements are all used for different purposes, and their lack, therefore, results in characteristic plant growth problems. For instance, lack of nitrogen gives stunted yellow plants and lack of phosphorus a purplish color. It should also be recognized that oversupply may be just as important as deficiency and frequently plants can be severely damaged or killed by an excess of any one element. Generally excess is not a problem in most soils but can become so by overzealous additions of elements.

The next logical point in this cycle is a look at the soil and especially the source of elements in the soil and forms in which they occur. The form of the element in the soil is important because some soils may have large quantities of a particular element, but plants die from lack of it when grown in the soil. This suggests that availability has to be considered in relationship to supply.

Perhaps this enigma is well illustrated in the case of nitrogen. This is an element which is not regularly found in the rocks and minerals—the parent material of soils. It is, however, found in large quantities in the air and in the soil atmosphere. However, this would not help most plants—they would rapidly die in a sea of nitrogen gas. Nitrogen then has to have a point of entrance into the soil and the plant in another form. Fortunately, nature

has provided for this and nitrogen can be changed from a free gas to a combined form available to plants. This process is called nitrogen fixation, requires energy, and is carried out by such diverse facets of nature as lightning storms and tiny bacteria which inhabit the soil.

Nitrogen can then be found in the soil in this fixed form or various conversion by-products also carried out by bacteria. This nitrogen is taken up by plants and other life in the soil and built in protein molecules. The plant dies, and the tissue falls to the soil surface. In this case the soil may be analyzed and total nitrogen found. However, the nitrogen tied up in living or dead plants or animals is not available for a plant at that particular time but may be at a later date. The same picture is true for other elements even with more complications, and the element may remain in an unavailable form. Such properties as soil acidity affect the available supply of many elements, principally by changing solubility. In the case of some plants, the role of some poorly understood relationships between higher plants and fungi or other organisms also affects elemental supply and legislates against any easy solution. Different plants may have different abilities to secure elements from the same soil.

In spite of these complexities, we do know that total amount of an element or amount of a specific form does have significance for a particular plant and a particular soil, and general recommendations can be given. We know that the upland glacial soils in northwestern Washington are generally poor in both nitrogen and available phosphorus, particularly for most of our cultivated plants. We also know that most construction activity by removing surface soils results in destruction of organic matter and nitrogen as well as other elements. Therefore, a good basic recommendation for most soils and plants would include nitrogen and phosphorus. In fact, I have found from experience that this combination is the first step in good gardening. Without providing proper amounts of nitrogen and phosphorus, other additions produce no results.

When an elemental deficiency is recognized, the next logical step is to supply the proper nutrient. This becomes a process of choosing what to apply, when, and how. Essential elements are sold in a wide variety of forms and at many prices. The guiding principle for purchasing these materials is to look for the chemical analysis—or the contents of elements being sold. This should be printed on all fertilizers. The big three of essential elements are nitrogen, phosphorus, and potassium, and these are listed as NPK in that order, meaning then that it is 6% nitrogen, 10% phosphorus and 10% potassium. A fertilizer may be sold as 6-10-10, the phosphorus and potassium usually being expressed in the form of the oxides, P_2O and K_2O. Other elements are also listed by percentage composition. Other materials may be inert filters or organic substances used to reduce burning effect of concentrated elements.

If one is interested in applying only nitrogen, there is no point in buying a mixed fertilizer as other elements are costly. Therefore, if you know your soil does not need a particular element, then you are wasting money by purchasing it. There are many instances where a complete fertilizer is best but there are many others where a single element is warranted, and one should not be misled and sold unnecessary material. The analysis on the bag should be the guide to correct fertilizer purchase when related to needs of soil and plants.

The form in which a particular element can be purchased also is subject to great variation resulting in price differences. In some cases differences in solubility or availability to a plant is involved; in others it may be different chemical associations.

In subsequent discussions particular elements will be dealt with in more detail.

HARMFUL PLANTS

LOVISA C. WAGONER*

CATS, like young children, enjoy sniffing, finding odors pleasant as well as informative; a two year old apparently finds that a pebble has an odor, if one may judge by sniffing, even if it is not so strong as that of some flowers. A cat, like a child, expresses disgust by a snarling expression when it finds an odor not to its liking. Yet both children and cats go on from smelling to tasting: children's fingers are made for putting objects in mouths, cat's sharp teeth for nibbling. So blossoms in garden or bouquet are sampled. Mrs. Roth (See Beulah Roth, *The Cosmopolitan Cat,* Doubleday, 1963. 74) says that a cat who goes on a spree of eating lily of the valley flowers may go into shock since those fragrant flowers contain digitalis. Nor are bouquets of lily of the valley the only ones that contain poisonous flowers. Another danger is that children sucking flowers of Carolina Yellow Jasmine, *(Gelsemium sempervirens),* for example, for the nectar at the same time may ingest the poison. This plant is to be distinguished from other varieties of *Jasminum.* Then too, 'Ferdinand' is famous for his olfactory discrimination.

As everyone knows, grass is essential for cats' well being. Many gardeners take a kind of pride in their habit of nibbling the leaves or petals of unfamiliar plants in order to identify, forgetting the chance of ending an experimenting career. How one would prevent a cat satisfying a need by eating one green leaf, from nibbling other plants, is one of the unknowns but one can explain to a child that nothing he picks without asking is to go into his mouth. It would seem also the part of wisdom to caution a nibbling gardener if there are young children about.

The harmful effect of dangerous plants varies: vomiting, diarrhea, mild to severe; stimulating or depressing; deadly poisonous; at the mildest extreme, irritating to the skin. Some plants are so poisonous that the least contact is harmful; others harm only when chewed and still others, when swallowed; some cause mechanical injury.

Harmful plants are both indigenous and naturalized, are grown commercially, in gardens both public and private, and as houseplants; they may be widespread or of limited distribution. It comes as something of a shock to learn that many garden subjects are poisonous if not in every part, in some part. Some of these have been introduced from the wild, some brought from other areas by settlers and by plant explorers, some are those that have been traditional in gardens. Some are plants known as "officinalis" because they have been used as remedies from earlier times, perhaps grown in monastery or palace gardens or are listed in the United States Pharmacopoeia. Some of these more recently have been cultivated in gardens for their beauty rather than for their healing properties.

In passing, attention may be called to the presence of medicinal substances, rediscovered by chemical analysis, in plants once scorned as herbal remedies. This, of course, must not be interpreted as a plea for amateur herbal therapy. Naturally, discussion of medical uses, for example, of foxglove, *(Digitalis purpurea)* which has naturalized itself so completely in some areas that it appears to be indigenous, is out of place here. In a later section, however, further reference will be made to this and related matters.

"Certain families of plants are characterized by distinct poisonous properties," according to Souder. (See Hugh L. Keegan and W. V. Macfarlane, Editors, *Venomous and Poisonous Animals and Noxious Plants of the Pacific Region;* a collection of papers based on a symposium in the Public Health and Medical Science Division at the Tenth Pacific Science Congress, A Pergamon Press Book, Macmillan 1963, pp. 15-29, Paul Souder, *Poisonous Plants in Guam* (15). "The

*Professor Emerita, Child Development, Mills College, Oakland, California.

Aroid, the Spurge, the Agave, the Nettle, the Umbellifera, the Strychnine, the Dogbane, the Milkweed, and the Solanum families all have poisonous properties. Poisonous plants differ in degree of harmfulness. Properties are sometimes affected by local conditions of soil, climate and cultivation. They may vary according to season. Certain plants may be highly poisonous, while others are harmless. Any plant which contains a milky juice should be treated with caution, until more is known about it."

Because a member of a dangerous family may be innocuous, it is all the more needful to look carefully into these matters; for example, while *Croton tiglium,* native to the East Indies, yields a powerful purgative oil, other Croton, highly colored ones, belonging to the genus *Codiaeum,* (sometimes planted to attract quail) such as *Croton glandulosa* and *Croton capitate* are not poisonous. It may very well be that the amateur should avoid every member of a family containing a poisonous variety. On the other hand, if this were applied to the family *Euphobiaceae,* to which Crotons belong, many delightful plants would be ruled out. Another member, poinsettia, has become part of our Christmas celebration in spite of the fact that its leaves are as dangerous as those of the oleander; a single leaf of either can be a deadly dose for a child. (See John M. Kingsbury, *Common Poisonous Plants,* New York State College of Agriculture, Cornell Extension Bulletin 538, Ithaca, 1964. 5.) Always the necessity of selection in terms of possible harm must be kept in mind, for whenever little children may be endangered, the pleasure of adults is certainly of secondary importance.

There are many genera within the family *Solanaceae;* for example, *Solanum* and *Lycopersicon.* To the former belong the nightshades, the potato, the Jerusaleum cherry, and bittersweet; to the latter belongs the tomato, that excellent food once known as love apple and thought to be poisonous. Several plants are called 'deadly nightshade'; two belonging to the family *Solanum* must be especially noted; the very dangerous one is Belladonna, *(Atropa Belladonna)* which is the source of important drugs and the other, although dangerous, less poisonous, *Solanum nigrum.* The confusion caused by using the same common name to refer to different plants is also illustrated by the name 'jasmine,' which refers to varieties of the Jasminum family *(Oeeaceae),* and also is used for *Gelsemium* of the family *Loganiaceae.* It is the latter, indigenous in certain Southern States, that is both deadly poisonous and especially attractive to children because its nectar is so sweet.

NOTE: Lists and pictures of dangerous plants are available for different parts of the country. Because of the great variety of climatic conditions, as is easily understandable, local lists are essential. Response to requests for help are so prompt and generous that the reader is urged to secure the appropriate lists, to have them at hand, to familiarize himself with the introduced and cultivated as well as with the wild and indigenous. Obviously, these adjectives are not mutually exclusive.

Some of the sources, which of course vary from state to state, are:

Departments of Pharmoscognacy in Colleges of Pharmacy
Wildflower Preservation Societies
The National Safety Council
The State Departments of Safety Education
Agricultural Extension Agents
Poison Control Centers

None of the lists, however, claims to be complete. All berries are to be suspect until their innocence has been established.

The publications of the New England Wildflower Preservation Society are particularly noteworthy and one wishes that the same carefully prepared illustrated lists were available for each section of the country.

An authoritative list, that makes no claim to being inclusive, "Common Poisonous Plants" is included in Anon., *Poison in the Backyard,* Family Safety, A National Safety Council Publication, Summer 1964, p. 5.

Obviously, the lists published in popular journals cannot be accepted as authoritative but must be checked carefully since the need for inclusive, reliable lists is not yet completely met.

A few examples will show that information must be both inclusive and specific as to area in which it grows, the particular variety, precise effects. One variety of a species, for example, the very large nightshade family, may be harmful, another edible, at least in part. One part of a plant may be harmful, every part of another; it may be the leaf, the stem, the root, the flower, the fruit, or all of these. Sometimes cooking will destroy the toxic properties; for example, pies are sometimes made of the berries of one form of the night-

shade family *(Solanum nigrum);* eaten raw the berries, especially when green, are poisonous. Boiling destroys the harmful quality of the red elderberry so that in some areas jelly, reported to be delicious, is made from them. The fact that birds or animals may safely eat cannot be taken as indication as fitness for human consumption. The mourning doves devour the red elderberries *(Sambucus callicarpa),* avidly stripping the bushes almost as soon as color begins to show. Other birds eat the berries of poke weed *(Phytolacca americana)* safely but they do not masticate the seeds. Another important thing to notice in each case is that potency is greater at certain seasons, that is, when the plant or fruit is at a certain stage of development.

Parts of some plants are commonly used for food while other parts are poisonous; for example, the sprouts and leaves of the so called Irish potato are poisonous, although the tuber itself is the best of food except when it has been exposed to the sun. Such poisonous sunburned portions are easily distinguished because of their green color. The raw green fruit and the leaf of the tomato *(Lycopersicon esculentum)* are poisonous as is the leaf blade of rhubarb *(Rheum Rhaponticum).* Kingsbury (op. cit. p. 11-12) says "of all the plants in the vegetable garden, rhubarb . . . is the most dangerous because persons occasionally use the leaf blade for food." Even when cooked it may cause dermatitis.

NOTE: Muenscher of Cornell University (See W. C. Muenscher, *Poisonous Plants of the United States,* Revised Edition, Macmillan, 1951) is concerned primarily with plants poisonous or otherwise harmful to domestic animals but he does add statements about the effects on human beings that make this the most comprehensive and authoritative treatment now available. He lists (See idem. pp. 7-10) 99 plants, indigenous, naturalized and cultivated, that have caused dermatitis, notes those that are poisonous, together with the part or parts that most frequently cause trouble. It is hoped that his volume dealing primarily with effects on human beings will soon be available.

While many wild plants are more important with regard to harmful effects on grazing animals, still it is to be kept in mind that often poisonous plants are the first to begin growing in the springtime and that children are eager to enjoy the early days of spring out of doors. (See Ward T. Huffman, Edward A. Moran, and Wayne Binns, *Poisonous Plants,* Yearbook, U. S. Dept. of Agriculture, 1956, p. 118.)

As has been pointed out, birds may safely eat where human beings may not. Consequently, lists of plants, shrubs, and trees prepared by the Audubon Society, for example, include those which are harmful to human beings. Landscape architects are concerned with design rather than with other properties of the plants they suggest. Gardening magazines, naturally, are primarily concerned with appearance and cultivation. Parents and teachers therefore, must bring to their study of any such list knowledge of harmful qualities; for example, if one reads the list recommended for the area of Greenwich, Connecticut, from the standpoint of the needs of birds, all is well, but the moment the reader thinks of children, he can only wish that the value of this excellent pamphlet had been increased by selecting in terms of child as well as of bird welfare (See Morton Duryea, *Wildlife Sanctuaries,* Publication No. 1, Audubon Center of Greenwich, Connecticut), or at least indicating possible dangers.

Distribution

Some harmful plants, as has just been said, whether indigenous, naturalized, or cultivated, are to be found in limited areas, others are more widespread. One form may grow in one area, another form in another section of the country.

The Snowberry *(Symphoricarpus albus)* is an example of an indigenous plant found pretty much over the United States. Sweet (Muriel Sweet, *Common Edible and Useful Plants of the West,* Naturegraph Co., 1962, p. 31) says the leaves are poisonous if eaten but tradition holds the berries also to be poisonous. These are an important wild life food because they hang on the bush most of the year. Gunther (See Erna Gunther, *Ethnobotany of Western Washington,* University of Washington, Pub. in Anthropology, 1945, 10, No. 1, University of Washington Press, 1945,

pp. 47-48) speaking of the widespread use of these berries by Indian tribes of Western Washington, says, "The berries are always steamed on rocks."

Examples of indigenous plants found in more limited areas should be given. The National Park Service in its Bulletin describing the Everglades National Park calls attention not only to poison ivy but also to two trees, found only in subtropical areas: (See National Park Service, Everglades National Park, Revised 1962, United States Printing Office, 1962, pp. 7, 8) Poison Tree, or Poison Wood, (Manchineel, or Manzanillo, *Hippomane Mancinella)* and Poison Apple or Tree of Death *(Metopium Toxiferum.)* The former, the more common one, and the less dangerous, is related to poison ivy. Contact with the milky sap, smoke from the burning wood coming into contact with the delicate tissues around the eyes, or inhaled, the fruit eaten, whether green or ripe, all cause irritation. (Letter from E. T. Christensen, Chief Park Naturalist, Everglades National Park, Jan. 21, 1964.) To eat the crabapple like fruit of the latter, the Poison Tree, may be disastrous, for it is deadly poisonous. Fortunately for park visitors, this tree grows in remote swampy areas and far less abundantly.

Death camas and the beach pea will serve as examples of poisonous plants indigenous in the Northwest. The beach pea *(Lathyrus maritimus)* is widespread, growing on sandy beaches along fresh and salt water. Not long ago a child who had eaten the green peas became violently ill but fortunately could be rushed to the hospital in time. Haskins (See Leslie L. Haskins, *Wild Flowers of the Pacific Coast,* Binfords and Mort, 1934, p. 97) says that these green peas are used like garden peas. It may be that cooking destroys the poisonous property.

The name Camas refers both to that widespread food plant so important in the diet of western Indians and recommended in lists of edible foods to be found in wilderness areas, Camasia or Quamasia (quamash). The other camas, Death Camas *(Zigadenus venosus)* is dreaded because it is poisonous to man and to beast even though the honey is reported to be both delicious and harmless. Members of the Lewis and Clark expedition suffered severly from eating this bulb. The two plants grow in identical situations but may be distinguished by the depth at which they grow. Unfortunately the poisonous bulb grows near the surface, the edible, more deeply. The two forms of camas planted in gardens, *C. leightlinii* and *C. cusickii,* are reported to be non-poisonous. (See Haskins, op. cit. pp. 29-35.)

Naturalized plants, as for example, Poison hemlock *(Conium maculatum)* and Jimsonweed or Thornapple *(Datura* species) are both deadly poisonous. These will be discussed further under the heading "Deadly Poisonous Plants." Unfortunately they are widespread in the United States.

Another example of a naturalized plant but one more limited in its area is the Scotch broom *(Cytisus scoparius,* sometimes listed as *Genista scoparia).* The seeds are poisonous. It is sometimes hard to realize that this shrub was at one time introduced into this area since now it grows so abundantly.

Along the Atlantic Coast and in the midwest Pokeweed or Pokeberry *(Phytolacca americana)* is common in open places. It is a violent but slow acting emetic; the root is the most poisonous, the seeds less so. The young shoots have been used as pot herbs, but they must be prepared and cooked with great care so that every bit of root is removed.

Plants Indigenous and Cultivated

Some species still found in their native areas are also cultivated. In some cases the cultivated form differs from the native. All forms of yew *(Taxus)* English, Japanese, both forms native to America, the Northwestern and Western, are poisonous in all their parts. The seed, because of its bright red aril is particularly dangerous.

In the eastern and northeastern states the European bittersweet *(Solanum dulcamarum)* is now naturalized; in the northwest it is cultivated in gardens. Its leaves and berries, much prized for dried arrangements, if eaten

in quantity may cause poisoning. As a matter of fact, two different plants are called bittersweet: the one just mentioned which is native in Asia as well as in Europe and *Celastrus scandens,* native in the eastern part of the United States, but introduced in other parts. This is also called false or shrubby bittersweet and also waxwork.

All forms of larkspur and delphinium, especially the seeds, every part of rhododendrons, and all *Ranunculaceae,* for example, Aconitum in its many forms not only *A. officinalis* contain violent poisons. Monkshood, of course, has long been a prized garden plant.

Harmful Cultivated Plants

The distribution of harmful cultivated plants depends upon climatic and soil conditions and the purpose for which the plant is grown.

Into the wild garden are brought plants indigenous locally, or in remote areas of this country. Some of these wildlings have found a place in the border, others in the rock garden. All bring with them their own properties. As is to be expected some of these plants have poisonous, irritating, or mechanically injurious properties. In addition to such information about plants in the wild, anyone who is responsible for young children must also know about the harmful qualities of cultivated plants, whether they are grown outdoors, indoors, or used as cut flowers.

One of the most dangerous cultivated plants is February daphne, *(Daphne Mezereum),* so much enjoyed for its early, abundant, and fragrant bloom and for its brilliant red berries. These, quite literally, have a fatal attraction for children; they do resemble edible berries like red currants and red huckleberries and grow at just the right height for picking.

Tulips, narcissus, snowdrops, colchicum, lily of the valley are examples drawn from the long list of harmful plants often found in gardens. In this large group are to be found all types, even the deadly poisonous.

Deadly Poisonous Plants

Plants growing wild that have adapted themselves to a different habitat often are assumed to be indigenous. When a child has been poisoned it probably makes no difference what the origin of the plant may be. On the other hand, anyone interested in the plants themselves finds this aspect worth noticing. One of the most dangerous examples is the poison or deadly hemlock, sometimes called poison parsley *(Conium maculatum).* No doubt it is all to the good that the almost instantaneous association with the words poison hemlock is 'Socrates' for this plant is so extremely dangerous. Although native to Europe and Asia it now grows freely and rankly in various parts of North America, along the wayside and in untended places, even within city limits. All parts of the plant contain the active principle and because it is so valuable medicinally thousands of pounds of leaves and seed are imported each year for the drug trade. (See Muriel, Sweet, *Common Edible and Useful Plants of the West,* Naturegraph Co., 1962, p. 48.) Flowers and seed heads are attractive, resembling Queen Anne's lace, *(Daucus carota),* so much prized by flower arrangers. This plant has its own unfortunate property for some individuals are sensitive to it.

A near relative, water hemlock or cow bane is acutely poisonous. Both young shoots and roots contain the poison. The form native to the eastern part of the United States is *Cicuta maculata.* Kingsbury (See John M. Kingsbury) says of this "because children are attracted to the fleshy roots and find them not unpleasant in taste, this plant should be eradicated in areas where children may find it." The form growing in the Northwest, *Cicuta douglasii,* provided an ingredient for the arrow poison used by the Klamath Indians. (See Leslie L. Haskin.)

Jimsonweed, thorn apple *(Datura stramonium)* grows both in waste places and back yards and also is cultivated in gardens. This plant is held responsible for more poisonings than any other; all parts are poisonous, the seed and leaves in particular.

Also found in neglected places is the poisonous ornamental vine called matrimony *(Lycium halmifolium* or *vulgare).* Both flow-

ers and its bright red fruits are attractive. This was introduced from Eurasia but it now is widespread, having escaped from gardens. Muenscher (See op. cit. p. 13) says "The fruits should never be eaten by humans or animals."

Deadly nightshade, Kingsbury says (See Kingsbury op. cit. p. 26), makes a poor common name because it refers to several different plants. The most poisonous is *Atropa Belladonna,* important economically as the source of drugs. Another, *Solanum nigrum* in some areas has been pretty well rooted out since the poisonous nature of the raw berries, especially when green, has been widely recognized. Yet the attractive plants are still to be found growing in waste places. Bailey in Hortus Second calls it "Cosmopolitan."

Leaves and roots of the several forms of false hellebore *(Veratrum),* native in the United States are poisonous. Their alkaloids are used medicinally to lower blood pressure. They grow in damp, acid soil and are so handsome that they are cultivated both in the border and in the wild garden. The species *viride,* also known as American white hellebore, native to eastern North America, is sometimes called Indian Poke. It is to be distinguished from pokeweed *(Phytolacca americana),* also deadly poisonous and also used medicinally. Bailey in Hortus Second lists two species growing in Washington, *californicum,* and *speciosum.*

Dealers in Botanicals list certain Restricted Herbs that they do not stock; some of these are Aconite root, Foxglove leaves, Jimsonweed, Juniper leaves. They also place an asterisk (*) before Poisonous Herbs, those regarded as dangerous if used in "improper amounts."

Plants Causing Nausea, Vomiting and Diarrhea

Often classed as poisonous along with the deadly are those that cause gastric effects of varying degrees of severity. Among these are many of the spring bulbs. While the gastric disturbance may be temporary, it may if quantities are eaten, be severe enough to cause acute or even fatal results. Perhaps it is for this reason that lists of harmful plants seldom distinguish degrees of poisoning, other than when appropriate to use the adjective fatal or deadly.

Plants Causing Dermatitis

Muenscher (See Muenscher op. cit.) lists 99 plants that cause dermatitis, but of course makes no claim that this list includes every irritating plant. While these plants cause less concern than the poisonous they are troublesome enough. Effect and degree of irritation are peculiar to the individual; one person may be critically sensitive to a particular plant but not at all sensitive to another. Those who regard themselves as immune may find that this is more apparent than real, depending upon amount and duration of contact. Just as individuals differ in the intensity of their reaction to poison ivy *(Rhus Toxicodendron),* found in the eastern part of the United States or poison oak *(Rhus diversiloba)* native to the Pacific Coast, or to poison sumac *(Rhus vernix)* or to *Primula obconica,* so they differ in reaction to many plants. On the other hand, the degree of tolerance cannot be measured and therefore no risks should be taken. In this area the Northwest nettle *(Urtica Lyallii)* is a familiar menace.

While allergic reaction may be a minor and temporary irritation and the inflammation of the skin, in other individuals it may be so violent as to endanger life. Some of the allergic responses to animal hair and dander are other examples of extreme reaction. Certainly effect is always more severe if mucous membranes have been exposed.

So many people are sensitive to *Primula obconica* that the plant is barred by some hospitals. In this connection it is interesting to note that a recent issue of the 'Primula Quarterly' (See Quarterly Journal of the Primrose Society, 1963, 21, 119) mentions the partial success of a German hybridizer in developing a form almost free from the irritating factor, primin.

Plants That Cause Mechanical Injury

Plants with spines, thorns, stiff hairs and those containing sharp crystals inflict mechanical injury. This group is perhaps of more importance in relation to children but adults also must be careful. The spines of cactus are too familiar to need more than mention. The sharp awns or bristles of barley for example and of fox grass can cause as much harm to human beings as to cats and dogs. Many of our prized shrubs are thorny, for example, hawthorne *(Crataegus)* in its many forms, both native and introduced from other parts of the world; the low growing naturally are more dangerous where children are concerned.

Then there are the plants that contain sharp crystals. The skunk cabbage native to eastern North America *(Symplocarpus foetidus)* contains oxylate crystals as is the case with many of the *Araceae* family. The yellow skunk cabbage of western North America *(Lysichitum americanum)* and the horse tail *(Equisetum)* contain not only the sharp crystals but also a substance that destroys vitamin B in the diet. (See Kingsbury, op. cit. p. 24.)

The calcium oxylate crystals in all forms of *Dieffenbachia* or dumb cane if chewed will injure the mucous membranes of mouth, tongue, and lips interfering with eating, swallowing, and speaking. Hence the common name dumb cane. If swallowed these crystals are poisonous. (See Kingsbury, op. cit. pp. 5-6.)

Plants Grown Indoors

Harmful plants may seem of less concern to the city dweller, especially the apartment resident, yet he also will come in touch with them on trips and excursions in parks and in friends' gardens. Now that indoor and patio plantings are so much a part of contemporary architecture, information about any poisonous or irritating quality of such bold, handsome, often brilliantly colored plants of sub-tropical or tropical origin, is especially important. Naturally many of these are grown outdoors in the southern parts of the United States. There is, however, little guidance from tradition which does offer some help regarding indigenous and common garden subjects. It is all the more important then to be informed about the dangerous nature of certain of these more recently introduced plants. The many varieties used today in interior decoration are often sold under common names; even the florist may not be familiar with the botanical names and may not himself be aware of any inherent danger.

Many factors influence the choice of plants: personal preference, suitability for use in a particular setting, fashion, but harmful aspects seem seldom to be taken into account. Spines, thorns, stinging hairs containing irritating substances, milky sap, microscopic stinging crystals, as well as those containing an alkaloid or other poisonous substances are features of the plants listed as desirable. An old-fashioned plant that continues to be grown indoors is the Crown of Thorns *(Euphorbia splendens)* which, as the name indicates, has thorns along the stem and these are so long as to be really spikes. In the long tabulation given in the Max Schling Book of Indoor Gardening (See Dorothy Brandon and A. F. Scheider, *The Max Schling Book of Indoor Gardening,* Ivan Obolensky, 1963, pp. 270, 304, 309) mentions a single plant as dangerous, the Oleander, remarking that a 'nibbling child or pet' may be poisoned, yet many fall into Souder's categories. This author (See Souder, op. cit.) lists many other plants belonging to different families. Among these are the well-known yellow leaf mother-in-law's tongue *(Sansevieria trifasciata* var. *Laurentii),* elephant ear *(Alocasia macrorhiza)* and, dumb cane *(Diffenbachia picta).*

Although it has been said that the Dieffenbachias are the only harmful house plants, reports of poisoning include a number of others, for example, several of the tropical plants commonly called elephant ear, Jerusalem or Natal cherry *(Solanum pseudocapsicum).* The latter, while native to the old world, is commonly used in this country as Christmas decoration. While some authorities state that the berries when fully ripe may be eaten, Muenscher (See Muenscher,

(Continued on Page 78)

The Arboretum Bulletin

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SPECIAL NOTICE

To keep memberships in the Arboretum Foundation in good standing, dues should be paid during the month payable. Active memberships more than three months in arrears will be dropped and The Bulletin will be discontinued.

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I hereby apply for membership in the Arboretum Foundation and remittance for same is enclosed to cover dues for the next succeeding 12 months.

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All memberships are non-assessable.

Change of Editor

After ten years occupation of the Editor's chair Mr. Mulligan has resigned this position with regret; due to pressure of administrative work. We count ourselves fortunate to have acquired in his place the experienced services of Dr. Henry Schmitz, President Emeritus of the University of Washington, formerly Editor-in-Chief of the *Journal of Forestry* for the Society of American Foresters, 1937-42.

Education Program

AUTUMN and winter classes presented by the Education Committee this season will include a 10-week course in home landscaping taught by Mr. Glen Hunt, well-known local landscape architect. This course promises to be somewhat different from the usual since the class members will be requested to bring photographs or slides of their gardens showing the house in relation to the garden and any particularly difficult area. Suggestions and recommendations will be made using the pictures as guides and it is hoped that various landscaping techniques will be demonstrated at the same time.

Dr. A. R. Kruckeberg, professor, Department of Botany, and several other members of the University Botany Department, will present four lectures on early plant explorations in the Pacific Northwest and their impact on botanical and horticultural science. These lectures are intended to give the gardener an insight into the rich historical background of the plants, wild or cultivated, that are native to our Northwest.

The ever popular Winter Propagation classes will again be given by Mr. L. J. Michaud. As in the past, three courses are being offered—hardwood cuttings, evergreen cuttings and seeds.

Anyone interested in these or other classes should call the Arboretum Foundation and request that they be placed on the Education Committee's mailing list. EAst 5-4510.

From Our Correspondents*

National Botanic Gardens
Glasnevin
Dublin 9, Ireland

Dear Mr. Mulligan:

It would be difficult to say thanks to you adequately for your most generous help and hospitality when we were in Seattle recently. All of it, need I say, was much appreciated and we will treasure the visit for a very long time to come.

You are to be congratulated on having assembled such a wonderful collection of plants and all set out in a most wonderful setting. All of what we saw and heard in Seattle has stimulated us and it is going to be most helpful to us when finally we get down to the problem of planning the Arboretum. Since we returned, the Irish government has made $150,000 available for preliminary work on the site—so you see we have already got the go-ahead signal. Mr. Fanning took over 600 photographs while we were in the United States so that our visit is well documented. I would like to comment on the private gardens we saw; I do not think I have seen better in any part of the world that I have been.

The weather was most kind nearly all the time we were in the United States and we saw most places under near ideal conditions.

I would like to say many thanks to all those charming people we met in Seattle who made our visit so memorable. I would like it if you would say a special word of thanks to Mr. Graham and to Mrs. Miller (who gave us lunch) and to the lady who brought us around in her car. Thanks for yourself is such an inadequate word.

With kind regards,

Sincerely yours,

T. J. Walsh

*All those who met Dr. Walsh and his two companions during their visit to Seattle on June 4 will appreciate this warm and cordial expression of thanks. We wish them well in their undertaking.

The Bloedel Foundation, Bainbridge Island, Washington, has donated to the Arboretum Library a copy of *Plantae Asiaticae Rariores,* by N. Wallich, 3 volumes, large folio, with 295 hand colored plates of Indian Plants, (London, 1830-32).

A very handsome Toota-gata stone lantern was placed near the northeast gate of the Japanese Garden in mid-August. Weighing some 3,000 pounds and nearly nine feet tall, this lantern was chosen in Japan by Mr. Juki Iida, landscape architect for the garden, to honor the late Carl M. Ballard, President of the Arboretum Foundation from 1955 to 1957. It is said to be about 300 years old and bears the crest of a well known Japanese family. Situated as it is among a group of small pine trees, it will "light" the main entrance for years to come.

This is your Arboretum, kept alive by your support

We are pleased to welcome the following new members (June 1 through September 15, 1964): *Supporting*—Skinner Foundation Trust. *Contributing*—Beardsley & Talley, William Calvert. *Sustaining*—Mrs. Jack H. Davis, James K. Fukuda, Mr. and Mrs. Baldwin McGaw, Mr. and Mrs. Richard R. Saulsman, Seattle Herb Society, Smart Gardeners, Washington State Herb Society, Mrs. Joe E. Wolff. *Annual*—Mrs. William I. Borman, Mrs. Goodwin Chase, Mrs. Francis Chervenka, Mrs. Gerald F. Child, City of Fort Worth Park and Recreation Dept., Mrs. Thomas R. Conway, Mrs. John Devlin, Mrs. Harold I. Dodge, Mrs. Herbert Drew, Mrs. E. J. Fisher, Mrs. Robert Gans, Jr., Mrs. W. J. Gill, Mrs. John Guberlet, Mrs. Peter I. Hamilton, Mrs. A. F. Johnson, Mrs. D. Roy Johnson, Mrs. J. O. Johnston, Mrs. Paul F. Lange, Mrs. Carteret Lawrence, Mrs. Gordon E. Magnuson, Mrs. Jahn E. Meaker, Mrs. Harold A. Molstad, Jr., Mrs. Lysle G. Paterson, Mrs. F. C. Peithman, Mrs. Minor W. Perry, Mr. and Mrs. MacMillan Pringle, Mrs. Chester Ramage, Milo Ryan, Mrs. Don F. Satterlee, Mrs. R. A. Schelling, June Smallwood, Dr. Leon C. Snyder, Mrs. W. Price Sullivan, Mrs. John M. Swihart, Mrs. Wells Thompson, Mrs. Jonathon Titcomb, Mrs. Lewis K. Todd, Mrs. Gerrit Vander Ende, Mr. and Mrs. Oscar H. Wallin, Mrs. Beatrice Welton, Mrs. Jack H. Whitesel, Mrs. Charles H. Wyble, Mrs. Walter R. Youngstrom.

We are also most grateful to the following members who have increased their dues to: *Supporting*—Arboretum of the Barnes Foundation. *Contributing*—Mrs. Homer Bergren, Clifton Nursery, Littlers. *Sustaining*—Rex and Joann Clark, Mrs. J. Richard Lane, Mrs. James G. McCurdy.

Some of Our Favorites☆

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Photinia Villosa

PLANTED beside steps as you come down along the walkway to our front door is a delightful small tree that all garden-minded guests invariably ask about. It is *Photinia villosa,* a little known relative of the evergreen Photinias, *serrulata* and *glabra*. My tree is about fifteen feet tall with an open, quite irregular branching habit. Some of the longer branches droop a little and sway in the breeze most gracefully. Leaves are dark green, about 1½ to 2 inches long, ½ inch wide, and have serrated margins. Three times a year this little tree steps forward for applause.

About mid-May it laces its branches with clusters of tiny white flowers held on short laterals. At this stage it somewhat resembles a Hawthorn to which it is related, being a member of the family *Rosacae*. It is a native of Japan, China, and Korea. It has been classified variously as *Crataegus villosa, Crataegus laevis, Stranvaesia digyna,* and *Pourthiaea villosa*. I am always delighted with my tree at this season and the picture of daintiness it creates is enhanced by the white flowers of *Rhodn*. 'Cunningham's White' blooming beside it.

In the fall its leaves turn the most beautiful vibrant shades of scarlet and bronze. It is one of the very best of the fall coloring trees and shrubs and merits a place in the garden for this reason alone.

After the leaves fall it has still a third display. May's corymbs of white flowers have now ripened into October's bright red berries held upright on stems one-half to one inch long. Usually only one to five berries develop from each of the corymbs of flowers so the berries are not in dense clusters but distributed all over the tree, retaining the characteristic of delicacy and lightness that belong to this tree. The berries persist into the winter.

Photinia villosa is hardy here. It wants sun and a well-drained location. While my tree is a delight to me I must admit that of the seven or eight I know in various gardens about half of them are totally lacking in appeal because of their habit of growth. *Photinia villosa* usually grows as a shrub. Headstrong and willful, it is often lacking in purpose as it goes about its growing. To my mind it is much more attractive when grown as a tree. This can be accomplished easily if a young plant is obtained and a meeting of minds established early between *Photinia* and a gardner. After this one problem is settled *Photinia villosa* is a great pleasure and I enthusiastically recommend it. It is quite free of pests and diseases. It is best planted for close viewing because both in flower and in berry it is modest enough to be overwhelmed by more strident performers in the garden. In its fall raiment it is a match for any plant.

BETTY (MRS. CONNER E.) GRAY

Seattle Needs More Street Trees

(Continued from Page 59)

maximum level cooperation of the City Engineering Department, the Board of Park Commissioners, the City Council, and the Mayor's Office. The committee should not be too large, and it perhaps should include one specialist in city government and one competent landscape architect. It should be appointed for a limited period of time—say, two years. Even though the committee would be unsalaried, it should be provided with adequate funds to employ a knowledgeable executive secretary and to publish at least one comprehensive report.

As I visualize the function of this committee, it should study the shade-tree situation in Seattle today, the number of miles of street on which trees might appropriately be planted eventually, it would attempt to assess the public attitude towards shade trees, it would recommend to the mayor a system of central control over city shade trees, it would estimate the cost of an adequate shade-tree program, and it would suggest the type of organization necessary to carry on this program.

Conceivably the study committee would recommend the establishment of a City Shade Tree Commission appointed by the mayor. This commission might have the same relationship to shade trees as the Board of Park Commissioners has to city parks. It is quite possible, however, that the problems of a city shade-tree commission would be far more difficult than those of the Board of Park Commissioners if for no other reasons than the fact that the street trees under its jurisdiction are planted on property under the administration of the City Engineering Department and that these trees could affect directly tens of thousands of our citizens. This would suggest the appointment of a very wise and competent commission if and when such a commission is appointed.

If Seattle plans to be a beautiful city twenty-five or fifty years from now, it is imperative that it begin to exercise far more adequate control over the establishment, care and maintenance of its street trees. No longer can the city, if indeed it ever could, depend on the tastes and choices of the individual property owner, on his concept of proper spacing, or his care of the trees. These decisions must be made by the competent central agency with adequate authority to decide what kinds of trees are to be planted and where they are to be planted.

Such a program will cost money—a considerable amount of money. It may also hasten the more rapid demise of the ugly power poles that have blighted this city for so many years. At any rate we need some action now. Seattle has rocked on dead center with respect to its street tree program for far too long a period of time. But before anything is done, it is imperative that we have a broadly acceptable blueprint of the course we are to follow.

Seattle has the natural setting to become a truly beautiful city. A well-conceived, publicly accepted plan for the establishment, care and maintenance of trees on selected streets could add much to the charm, grace, and dignity of Seattle of the future and the quality of living therein. The time to begin is now.

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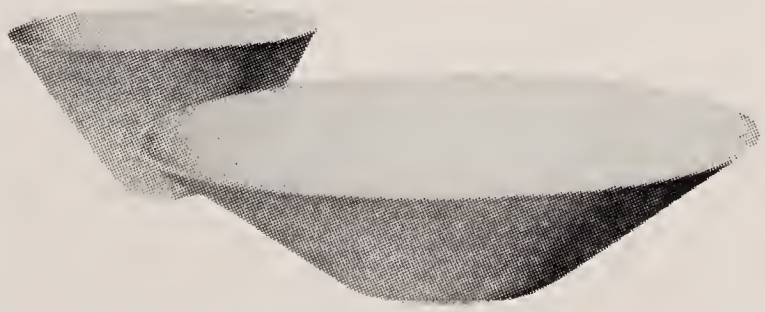

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BOOK REVIEWS

Garden Plants in Japan, Fumio Kitamura and Yurio Ishizu. Kokusai Bunka Shinkokai (The Society for International Cultural Relations), Tokyo, Japan (1963).

THIS beautiful little book was sent to the University of Washington Arboretum by the Garden Club of America, with a note stating that it had been "published in the hope that it will fill the need for a guide to the plant material found in the Gardens of Japan." Publication was made possible by contributions from Garden Club of America members, "as an expression of their appreciation for the generous hospitality shown them on their visit to Japan. — It is intended for complimentary distribution to assist visitors — in the identification of garden plants."

It will indeed fill a need. Many books have been published on the gardens of Japan, but their approach has mostly been the one of landscape design, with at best a stark list of the trees and shrubs most commonly used, leaving the usual interested visitor at an exasperated loss amidst fascinating surroundings. Our experience a few years ago was that there was seldom anyone at all to inquire of for identification, and if someone could give a name to a plant, it would be the Japanese common name. (A notable exception was the botanic garden of the University of Kyoto, where all plants were beautifully labeled with Japanese and Latin names.)

The authors are faculty members of the University of Tokyo and their informative and delightful text, covering 209 selected garden plants (about one-third of the most frequently seen garden subjects) is beautifully enhanced by a generous offering of Mr. Tsuneo Nakamura's sensitive black-and-white photographs for each of the desired species, frequently both distant and close-up pictures. Such prime indispensables of Japanese gardens as *Pinus Thunbergii, P. densiflora, Acer palmatum* and *Camellia japonica* are even more lavishly treated. There is a number of photographs nicely illustrating some Japanese garden design techniques, and 16 pages of color pictures of favorite plants.

The order of presentation is according to families, from *Cycas revoluta,* which, as the authors say, is "planted to produce a peculiar touch of the South," to *Weigela coraeensis* and *Trachycarpus Fortunei,* the windmill palm, followed by short sections on bamboos and herbs, including of course, among others, paeonies, irises and chrysanthemums.

For each species is given its habitat, a brief description of the character of the plant with mention of its particular attractive qualities, its requirements as to climate, situation and soil, whether it will transplant and how it is propagated. Resistance to smoke, fire, sea breezes and pruning are mentioned — and we commence to get a picture of the Japanese landscape designer's problems. *Chimonanthus praecox* is noted as "comparatively weak against heat," a reminder that the Japanese islands stretch about 1,300 miles north and south and include a great variety of hot and cold locations.

A piece de resistance is the paragraph on Use, both garden and utilitarian. A number of shrubs are recommended as suitable for windbreaks, hedges and seaside planting, e. g. *Pittosporum Tobira.* As fire screens are suggested, for example, *Ginkgo biloba* and *Sciadopitys verticillata. Paulownia tomentosa* is said to be not much planted in gardens but "an indispensable material in making furniture." The old time favorites are pointed out as well as those suitable for bonsai, pot culture and flower arrangement; also the plants appropriate for Western style gardens and rock gardens. It is delightful to read that children like to chew the sweet and pungent flavored branches of *Cinnamomum Loureiri,* that *Sorbus commixta* is "planted in parks to build a wood for bird call," and of the "beauty in the rain-trodden garden" of *Malus Halliana.* Typical of Japanese garden uses are the remarks on *Euonymus alatus* "by the side of garden stones, near a pond or stream on an artificial hill or under larger trees. — Sometimes it is used in group planting after being pruned into a proper form." The love of the Japanese for their flora and the knowledge accumulated by them through centuries of experience in growing are implicit on every page.

For each species are given the Japanese and English common names and the Latin name, and there are separate indices for each category. Having heard at Kyoto that Sarusuberi, the common name for the smooth-trunked *Lagerstromeia indica,* means "monkey slide," we suspect we are missing out on some fun by not being able to translate all the others. At any rate, our Japanese-English dictionary indicates that their common name for their native Pussy Willow would be translated as Cat Willow — same idea on both sides of the ocean. At the end is a short list of places specially good for viewing some of the favorite species.

We have inquired of the publishing society if this book could be bought and the answer was no. However, the Bonsai Unit of the Arboretum Foundation, which toured Japan this spring, was given copies for the asking, and presumably others sufficiently interested to request will be equally fortunate.

Dorothy Metheny

* * *

Let's Grow Lilies. An illustrated Handbook of Lily Culture by The North American Lily Society. Pictures and Text by Virginia Howie and other members of the N.A.L.S., 1964; 50 pp; paper; $1.00 postpaid.

THIS charming booklet not only supplies the information needed by beginners but also shows experienced lily growers how to obtain better results. Ten brief chapters cover a complete range of material from how to recognize a lily, through descriptions of the types of lilies and where each may best be grown, on to how to buy, how to plant and how to propagate lilies. Material on the hybridization and the showing of lilies is included.

The vocabulary is well chosen, simple but scientifically accurate. A well selected glossary of lily language and a list of lily species add to the book's value.

Let's Grow Lilies is a new departure in gardening handbooks and may well set a new trend in books for gardeners. The lively style and the generous use of delightful drawings make the book most attractive as well as most useful. It will be a welcomed addition to garden club libraries and will furnish excellent material for garden club programs, though every lily grower will want his own copy. In quantities it is available at reduced rates, (e. g. 25-100 copies at 55 cents each, plus postage). Order from: E. F. Stokes, Treas., North American Lily Society, 21 Oakland Street, Lexington, Massachusetts.

Gretchen Kaufman

The New Seattle Public Library —In a Landscaped Setting

(Continued from Page 56)

Plant Materials including purchased materials, interior house plants, heeling-in and moving back existing trees and shrubs	$10,000.00
Planting Trees and shrubs	1,700.00
Planting bed preparation including materials	5,600.00
Service Walks, Mountain Rock, and Pebble Paving	2,700.00
Terrazzo Planting Tubs	4,000.00
Sprinkler System	3,500.00
Garden Lights, Plant Labels, etc.	2,500.00
Total	$30,000.00

As to the selection of plant materials, it will be noted that the basic plantings are evergreen or broadleaf evergreen plants. Most of the tree varieties are quite naturally deciduous, but the only deciduous shrubs used were *Rhododendron mucronulatum, Azalea Schlippenbachii* and *A. occidentalis, Cornus Kousa* and *Cornus florida rubra, Rhus typhina, Acer palmatum* in variety, *Cotoneaster horizontalis* and *Berberis Thunbergii Atropurpurea.*

A cross section of the 16 varieties of specimen trees and the 56 varieties of shrubs can be gleaned from the following list of materials which were indentified by plant labels.

Trees

Abies lasiocarpa, Alpine Fir
Ginkgo biloba, Maidenhair Tree
Oxydendrum arboreum, Sourwood
Quercus palustris, Pin oak
Tsuga Mertensiana, Mountain Hemlock
Acer Negundo 'Variegatum'
Magnolia Kobus, Kobus Magnolia
Pinus sylvestris, Scots Pine
Styrax japonica, Japanese Snowbell

Shrubs

Azalea macrantha, Bigflower Azalea
Azalea Schlippenbachii, Royal Azalea
Buxus sempervirens, Common Boxwood
Ceanothus gloriosus, Point Reyes Ceanothus
Cornus Kousa, Kousa Dogwood
Cotoneaster horizontalis, Rock Cotoneaster
Daphne odora, Winter Daphne
Euonymus Fortunei radicans, Common Wintercreeper
Ilex crenata microphylla, Littleleaf Japanese Holly
Juniperus chinensis Pfitzeriana, Pfitzer Juniper
Juniperus Sabina tamariscifolia, Tamarix Juniper
Kalmia latifolia, Mountain laurel
Myrica californica, Pacific Wax Myrtle
Pernettya mucronata, Chilean Pernettya
Pieris japonica, Japanese Pieris
Prunus Laurocerasus Zabeliana, Zabel Laurel
Rhododendron mucronulatum, Korean Rhododendron
Sarcococca ruscifolia, Fragrant Sarcococca
Skimmia japonica, Japanese Skimmia
Viburnum Burkwoodii, Burkwood Viburnum
Viburnum Davidii, David Viburnum

These plants have now been in place for five growing seasons, which gives a fair idea of the length of time required for the individual plants to blend together as plant groupings without overplanting at the outset.

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AT COTTAGE LAKE

An Arboretum of True Firs in Grass Valley, California

(Continued from Page 60)

During the summers of 1961, 1962, and 1963 various 4-H Clubs in Nevada County have cultivated around the trees and watered them at about two-week intervals. Some losses have occurred from rabbits and deer and some replanting was done in several of the plots with stock from the Institute of Forest Genetics. Ten trees each of *Abies alba* European Silver Fir and *Abies firma,* Momi Fir from Japan were added in March 1963. Fraser Fir is the only species with no survival.

Besides the two new lots mentioned above the following small seedling trees supplied by the Institute of Forest Genetics were planted in the species plots in March 1963:

Abies Nordmanniana	Lot D	10 trees
" *concolor*	Lots E and G	20 "
" *magnifica shastensis*	Lot A	10 "
" *grandis*	Lots D, E, F	30 "
" *lasiocarpa*	Lots B and C	20 "

The Forest Service is conducting a similar planting at higher elevation in Eldorado County and seeds of additional species are being secured from around the world as rapidly as possible, and when seedlings are available they will be allocated for this Arboretum planting. No trees of additional species were available for planting in the spring of 1964, but the 4-H Club members and leaders held a work day at the Arboretum on May 9th for cultivating around the trees and the preparation of basins around them for occasional irrigation during the summer which will now be taken care of by the city of Grass Valley.

The last survival count of trees made in August 1962 showed the following:

Species	*Total Planted*	*No. surviving Aug. 1962*
Abies balsamea	37	35
" *Fraseri*	11	0
" *cephalonica*	1	1
" *Bornmuelleriana*	18	8
" *Nordmanniana*	33	23
" *Pinsapo*	26	10
" *Forrestii*	25	17
" *concolor*	30	28
" *grandis*	30	21
" *magnifica*	26	20
" *magnifica shastensis*	26	14
" *lasiocarpa*	25	5

" *amabilis*	25	3
" *procera* (nobilis)	28	17
Total	341	202

This is a project which has achieved a lot of local interest and support, and it is hoped that during the next decade it will be possible to secure most of the 40 true firs of the world and get them established here in groups of ten trees or more.

NOTE: Grass Valley is located in Nevada Co., northern California, about 30 miles east of Marysville (on Hwy. 99E) and 46 miles north-east of Sacramento.

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Harmful Plants

(Continued from Page 69)

op. cit. p. 208) says that the fruits contain toxic substances that may cause severe poisoning. Whenever differing statements are made it would seem the point of wisdom to follow the advice of the most alarming unless one is competent to judge the degree of authority of various writers.

Edible Wild Plants

Handbooks for the use of vacationers and other travelers in wilderness areas and the survival manuals prepared for the Armed Forces, describe plants growing wild that are both safe to eat and nutritious. These publications draw upon ethnobotany and also upon the culinary practices of people who have lived long in a particular area. Through experience residents and explorers have learned what to use, what to avoid, and how to prepare for safe and nutritious food.

Lest the harmful qualities of plants seem unduly stressed, mention should be made of uncultivated plants that are good to eat. Now that so many families spend vacations in National Forests and Parks and in wilderness areas, it is important to be able to recognize harmful plants growing not only in the home locality but also in the area visited. In addition appreciation of edible plants in the wild adds interest even if the plants are never needed for food. Contemporary use of native plants as garden subjects and concern for conservation of plants found in the wild may increase the need for caution but will also make edible plants of added interest. Always it must be remembered that it is important to know plants in their different stages of growth, for some are edible or poisonous depending upon maturity.

Children may have their early lessons in ethnobotany and also in the history of exploration through learning to recognize edible plants, knowing what part is edible, and how to prepare if scrupulous washing or cooking is necessary.

The fruit of the May apple, for example, *(Podophyllum peltatum)* is good to eat but the root is poisonous. Taro *(Colocasia esculenta),* when properly prepared, becomes the poi so important a food in the islands of the Pacific. Yet this root uncooked is poisonous. The young shoots, forced and blanched like endive, are cooked as a vegetable.

The handbooks that have been referred to are prepared for use in limited areas. On the other hand, Medsger's discussion included the whole United States (See Oliver P. Medsger, *Edible Wild Plants,* Macmillan, 1954). The phrase "where lambs may safely graze" so long ago set to music by Bach, takes on a new meaning when one begins to look into this matter of edible and poisonous plants.

Unfortunately, the handbooks intended for general use do not always distinguish clearly enough to help the amateur recognize the plants that are harmful nor do they point out the part that is to be avoided, stages of growth when danger is present, quantity that might be safely eaten. To distinguish between safe and dangerous is not always easy. As mentioned above, the name Camas is used commonly for two distinct species, one of which has been an important food item and still is, and the other, deadly poisonous. The latter, *Zigadenus venenosus,* is poisonous to animals as well as human beings, and the former *Camassia quamash* is very nutritious. Both bulb and young shoots of this form of *Camassia Leichtlinii* (See Hasking, op. cit. pp. 29-35) have been and continue to be important foods. Because it is so very difficult for the amateur to distinguish between the edible and poisonous, neither should be eaten unless identified by the expert. Fortunately, it is *Camassia Leichtlinii* that is most desirable as a garden flower.

The various wild onions, distinguished by their common *allium* odor, are edible as are *fritillaria, erythronium,* and mariposa lily bulbs. As Medsger (See Medsger, op. cit. pp. 177-178) says, the mariposa lilies are so beautiful as flowers that the bulbs should be eaten only as a last resort. This statement is equally true of the *fritillaria* and *erythronium* bulbs.

As with harmful plants the list of edible plants could be almost indefinitely extended.

A further source of danger not inherent in the plant itself is water pollution. Water cress, for example, is safe to eat only when it grows in pure water. Because the purity of the water cannot be easily determined it is wise to leave even so pleasant addition to a picnic meal untouched. The beautiful book prepared by Margaret Mckenney and Edith F. Johnson (See Margaret Mckenney and Edith F. Johnston, *A Book of Wayside Fruits,* Macmillan, 1945), *'A Book of Wayside Fruits,'* describes and illustrates wild or native fruits which are good food for birds or animals but does not point out which ones may be injurious to human beings. Just as the hazards of cultivated berries and fruits are increased by the residues of sprays so the hazards of wayside fruits are increased by drifting sprays. Not only this, but their abundance is limited by the use of herbicides.

Since published statements about the use of plants for food, about harmful properties, about methods of preparation, and other matters do not all agree and since not all statements are clear to the non-technical reader, caution certainly is the part of wisdom, rather than an experimental attitude.

In animal feeding the toxic substance in bracken appears to be cumulative so that the harmful effects occur when large amounts are eaten. (See U.S.D.A., *Yearbook of Agriculture,* 1956, p. 128; Kingsbury, op. cit. pp. 20-21.) Even though in handbooks bracken is listed as edible, this point may well be kept in mind for while it is hardly likely that human beings eat in quantity, the possibility of harm exists. The caution ". . . in case of any doubt it is better to avoid the plant concerned and to use those whose identity is unquestioned" (See Adam F. Szczawinski and George A. Hardy, *Guide to Common Edible Plants of British Columbia,* British Columbia Provincial Museum Dept. of Research and Conservation, Handbook No. 20, 1962. This caution would seem to apply also to any plant which has been found poisonous to animals.

The common names of plants often indicate traditional use as in the case of Labrador Tea *(Ledum groenlandicum).* The leaves are said to have narcotic properties and therefore should be used only with great care. *Ledum Grandulosum* has the reputation of being poisonous. This plant which occurs in mountainous districts east of the Cascade Mountains (See Szczawinski and Hardy, op. cit. pp. 8-23) may be distinguished by the pale underside of the leaf and the resinous exudate.

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